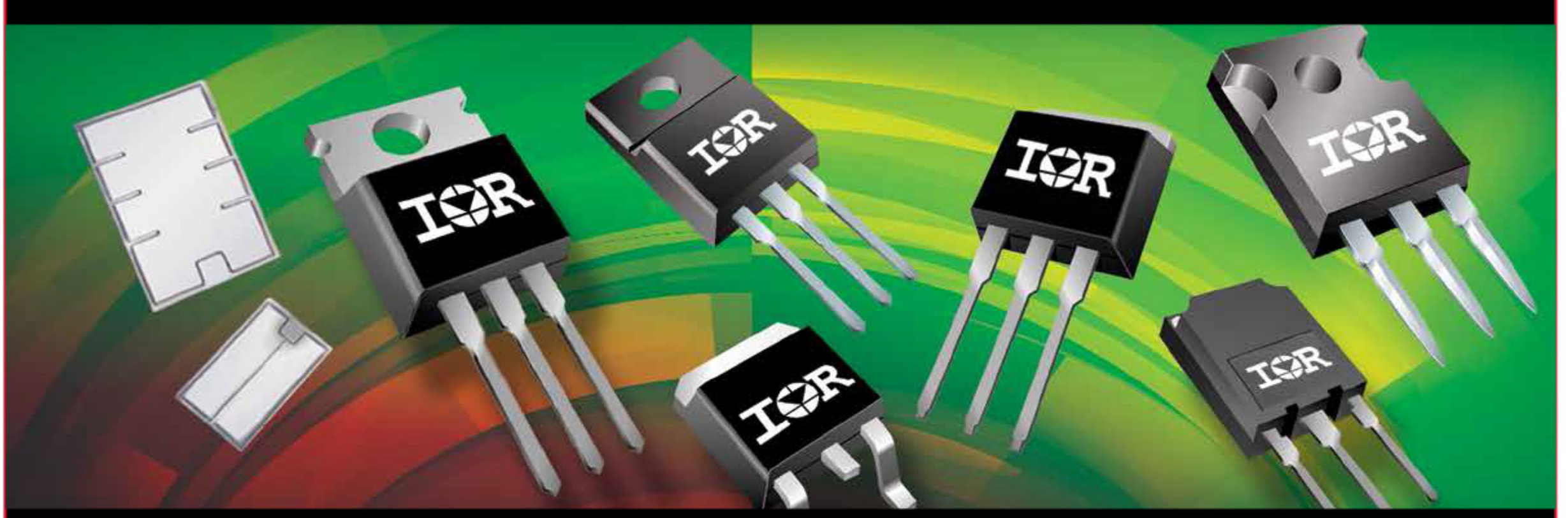
IGBT
Product Selection Guide



International
IOR Rectifier
THE POWER MANAGEMENT LEADER

IGBTs

IR offers a wide portfolio of IGBTs allowing customers to meet design and performance goals. Various technologies such as NPT (Non-Punch Through) and Trench allow lowest switching and conduction losses to increase efficiency, reduce thermal problems and improve power density.

- **Motor Drive** - Recommended for motor drive inverters. They are all co-packaged with freewheeling diode.
- **UPS, Solar Inverter** - Designed for switching frequencies between 15-25 kHz they are typically used in UPS and Solar Inverters.
- **PFC** - Designed with low switching losses for operation at high frequency up to 100kHz.
- **Welding, HID** - Designed for lowest conduction losses, they are best suited for switching frequencies below 1kHz in applications .
- **Die** - Most IGBTs are available on Die. Please contact our Die Sales Team if you require any further information.

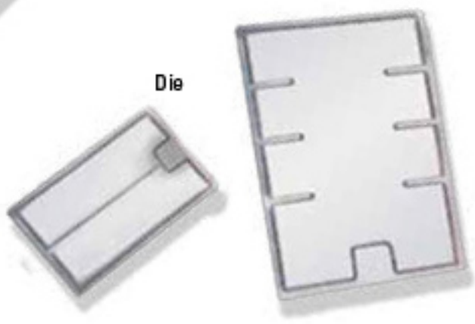

TO-220


TO-247AC


TO-262


TO-220FP


D²Pak


Die


D Pak


Super 247

IRAM

- SIP1 and SIP2 are widely accepted for 6A, 10A, 16A & 20A modules
- SIP1A is the new Heavy-Duty generation IRAMs featuring new ICs, Trench and improved power cycling ruggedness
- SIP3 carries higher power


SIP-2


SIP-3


SIP-1

Integrated Power Modules

Part	Voltage & Shunt	Typical Load (W)	IO @ TC = 100°C (A RMS)	Package
IRAMS06UP60A	600V Open Emitter	400W	3	SIP-1
IRAMS06UP60B	600V Integr. Shunt			
IRAM136-1061A2	600V Open Emitter	750W	5	SIP-1A
IRAMS10UP60A	600V Open Emitter	750W	5	SIP-1
IRAMS10UP60B	600V Integr. Shunt			
IRAMS12UP60A	600V Open Emitter	1000W	6	
IRAMX16UP60A	600V Open Emitter	1500W	8	SIP-2
IRAMX16UP60B	600V Integr. Shunt			
IRAMX20UP60A	600V Open Emitter	2500W	10	
IRAMY20UP60B	600V Integr. Shunt			SIP-3
IRAM136-3063B	600V Integr. Shunt	3000W	15	
IRAM136-3023B	150V Integr. Shunt	750W	15	

IGBT Online Selection Tool - mypower.irf.com/igbt

Conditions

Bus Voltage

Package Requirements

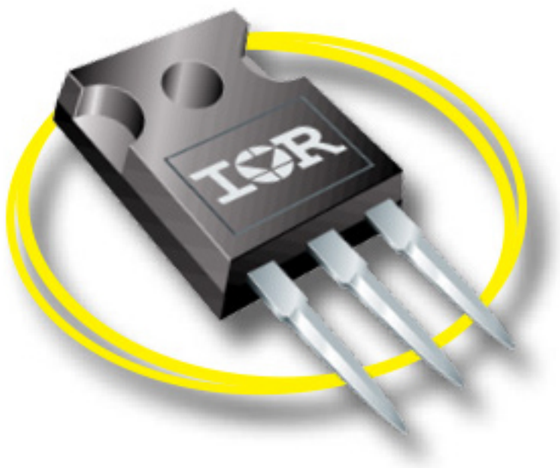
Current

Frequency

Short Circuit

Online IGBT Selection Tool

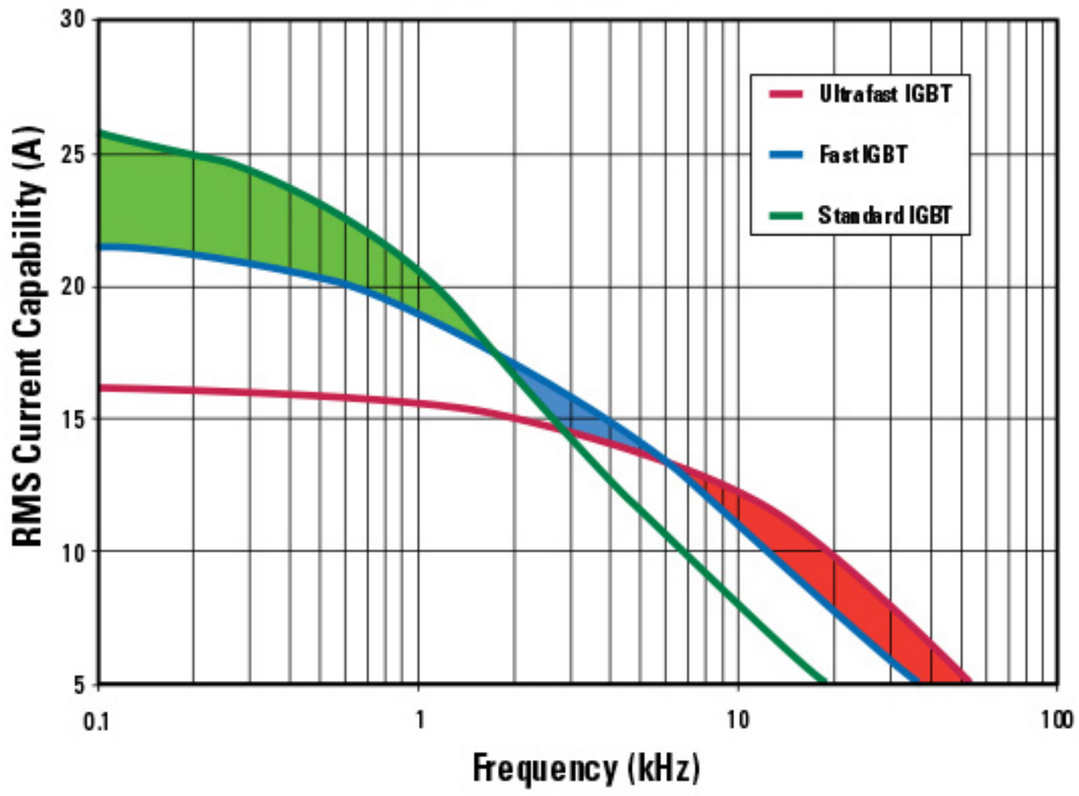
Optimized IGBT



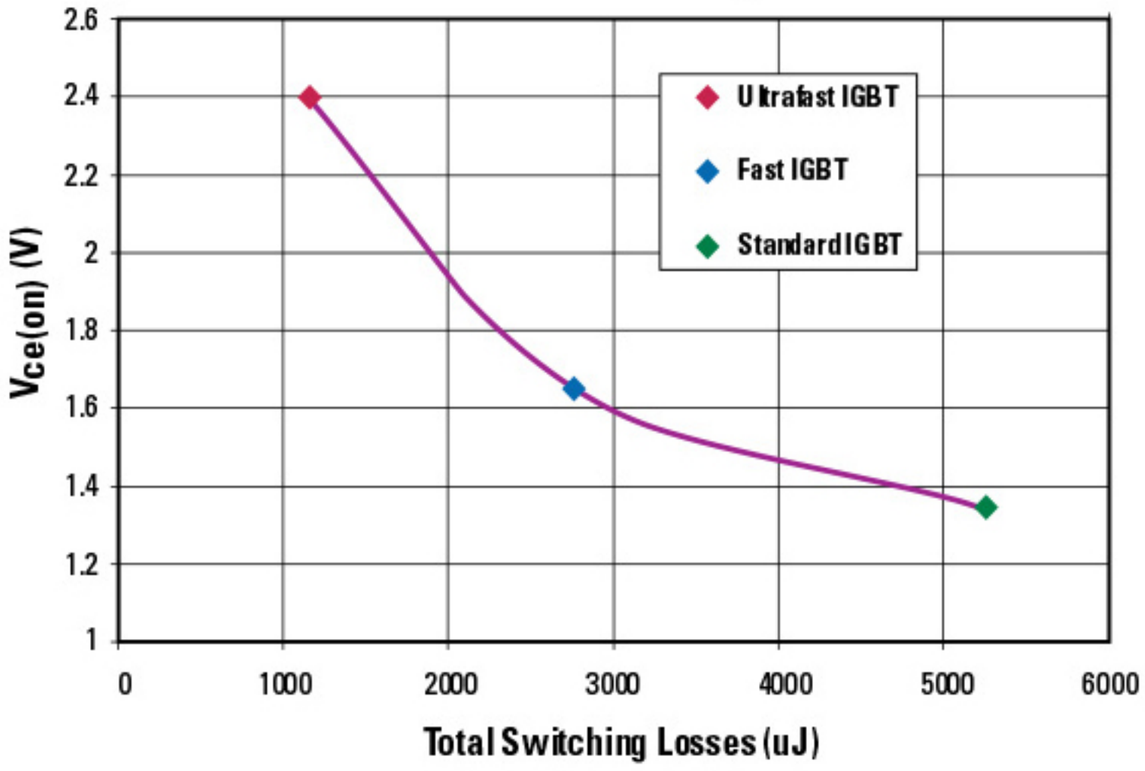
- Use application conditions
- Calculate conduction losses
- Calculate switching losses
- Provide MSRP to show cost implicactions of design choices

http://mypower.irf.com/IGBT

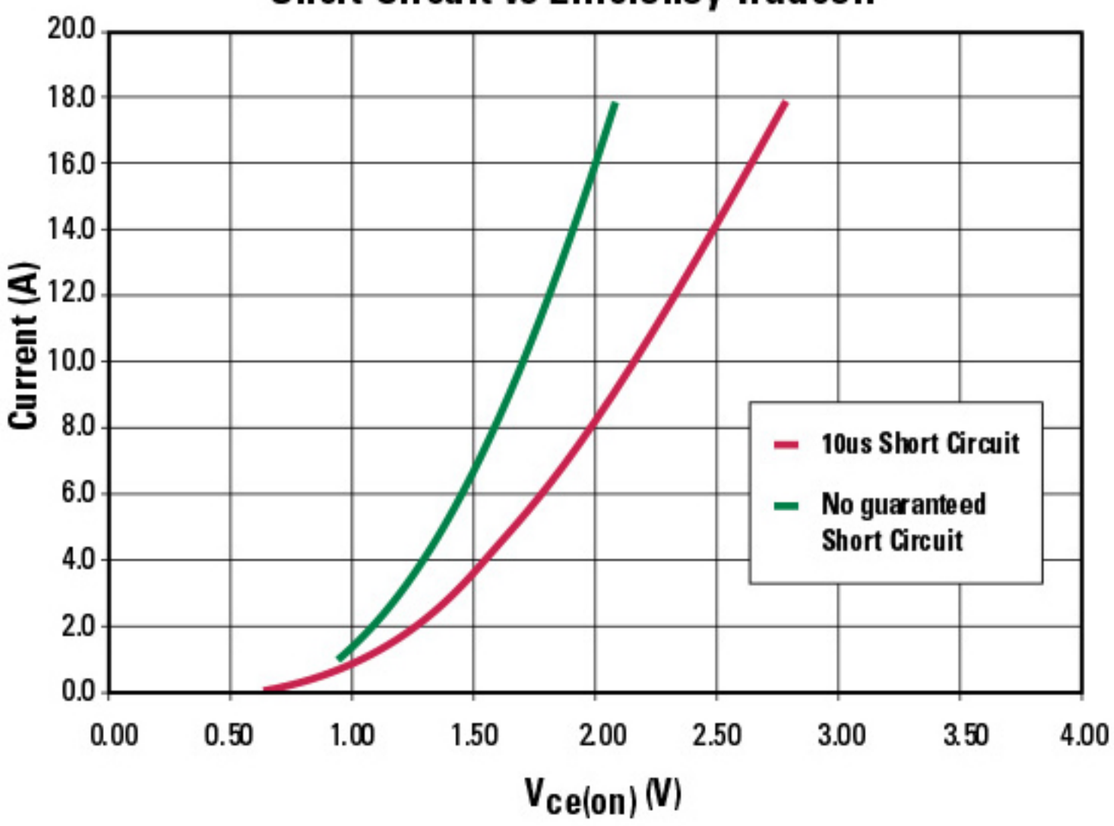
Speed Tradeoffs



Conduction Losses vs Switching Losses Tradeoff



Short Circuit vs Efficiency Tradeoff



IGBT Product Selection Guide

Single Rugged IGBTs (with Tsc)

Voltage	Speed	I_c @ 100°C	$V_{CE(ON)}$ (typ)	Tsc (µs)	TO-262	D²PAK	TO-220	TO-247	TO-247 (Long Lead)	Super TO-247
430	DC-1 kHz	14	1.55	10	IRGSL14C40L	IRGS14C40L	IRGB14C40L			
600	8-30 kHz	7	2.10	10		IRGS4B60K	IRGB4B60K			
		7	1.80	10		IRGS6B60K	IRGB6B60K			
		15	1.80	10		IRGS15B60K				
		16	2.21	10			IRG4BC30K	IRG4PC30K		
		19	1.80	10		IRGS8B60K	IRGB8B60K			
		24	1.60	5					IRGP4062-E	
		25	2.10	10			IRG4BC40K	IRG4PC40K		
		30	1.84	10				IRG4PC50K		
		48	1.65	5				IRGP4063		
		50	1.60	5				IRGP4069	IRGP4069-E	
		50	1.95	10	IRGSL30B60K	IRGS30B60K	IRGB30B60K			
		60	1.83	10						IRG4PSC71KPBF
		90	1.70	5				IRGP4066	IRGP4066-E	
650		48	1.65	5				IRGP4263	IRGP4263-E	
		90	1.70	5				IRGP4266	IRGP4266-E	
1,200		5	3.17	10	IRG4BH20K-L	IRG4BH20K-S		IRG4PH20K		
		10	3.10	10				IRG4PH30K		
		15	2.74	10				IRG4PH40K		
		23	2.05	10				IRG7PH30K10		
		24	2.43	10				IRG4PH50K		
		42	2.97	10						IRG4PSH71K
		130	2.00	10						IRG7PSH73K10

Co-Pack Rugged IGBTs (with Tsc)

Voltage	Speed	I_c @ 100°C	$V_{CE(ON)}$ (typ)	Tsc (us)	V_F (typ)	TO-262	D-PAK	D²PAK	TO-220	TO-220 FullPak	TO-247	TO-247 (Long Lead)	Super TO-247
300	8-30 kHz	40	1.46	5	2.26						IRGP4072D		
600	1-8 kHz	5	1.60	3	1.30								
		8	1.66	10	1.40					IRG4IBC20FD			
		9	1.88	10	1.50				IRG4BC15MD				
		11	1.85	10	1.40				IRG4BC20MD				
	8-30 kHz	2	1.83	10	1.50		IRGR2B60KD2						
		4	1.75	5	1.60				IRGB4059D				
		5	2.39	10	1.50		IRG4RC10KD		IRG4BC10KD				
		6	1.70	5	1.60		IRGR4045D	IRGS4045D	IRGB4045D				
		6	2.27	10	1.40					IRG4IBC20KD			
		8	1.55	5	1.80				IRGB4060D				
		8	1.80	10	1.25					IRGIB7B60KD			
		9	2.10	10	1.40	IRGSL4B60KD1		IRGS4B60KD1	IRGB4B60KD1				
		9	2.27	10	1.40			IRG4BC20KD-S	IRG4BC20KD				
		9	2.21	10	1.40					IRG4IBC30KD			
		10	1.60	5	2.50			IRGS4064D	IRGB4064D				
		10	1.70	10	1.80					IRGIB10B60KD1			
		10	1.80	10	1.25	IRGSL6B60KD		IRGS6B60KD	IRGB6B60KD	IRGIB6B60KD			
		12	1.55	5	2.10			IRGS4056D	IRGB4056D				
		12	1.80	10	1.69					IRGIB15B60KD1			
		15	1.80	10	1.20	IRGSL15B60KD		IRGS15B60KD	IRGB15B60KD				
		16	2.21	10	1.40			IRG4BC30KD-S	IRG4BC30KD		IRG4PC30KD		
		18	1.65	5	2.30				IRGB4061D				
		19	1.80	10	1.30	IRGSL10B60KD		IRGS10B60KD	IRGB10B60KD				
		24	1.60	5	1.80	IRGSL4062D		IRGS4062D	IRGB4062D		IRGP4062D	IRGP4062D-E	
		25	2.10	10	1.30						IRG4PC40KD		
		30	1.84	10	1.30						IRG4PC50KD	IRG4PC50KD-E	
		30	1.95	10	1.30							IRGP30B60KD-E	
		40	1.60	5	1.80						IRGP4640D	IRGP4640D-E	
		48	1.65	5	1.95						IRGP4063D	IRGP4063D-E	
		48	1.65	5	0.96						IRGP4068D	IRGP4068D-E	
		48	1.65	5	2.00						IRGP4063D1	IRGP4063D1-E	
		50	1.60	5	2.20						IRGP4078D	IRGP4078D-E	
		50	1.60	5	2.20						IRGP4650D	IRGP4650D-E	
		60	1.65	5	1.95						IRGP4660D	IRGP4660D-E	
		60	1.83	10	1.40								IRG4PSC71KD
		90	1.70	5	2.23						IRGP4066D	IRGP4066D-E	
		160	1.70	5	2.40								IRGPS4067D
1,200		5	3.17	10	2.50						IRG4PH20KD		
		6	2.75	10	2.13				IRGB5B120KD				
		10	3.10	10	3.40						IRG4PH30KD		
		15	2.74	10	2.60						IRG4PH40KD		
		16	2.05	10	2.00						IRG7PH30K10D		
		20	3.05	10	1.67							IRGP20B120UD-E	
		24	2.77	10	2.50						IRG4PH50KD		
		25	1.90	10	TBD						IRG7PH37K10D	IRG7PH37K10D-E	
		30	2.46	10	1.86						IRGP30B120KD	IRGP30B120KD-E	
		40	1.90	10	TBD						IRG7PH44K10D	IRG7PH44K10D-E	
		40	3.12	10	2.03								IRGPS40B120UD
		42	2.97	10	2.50								IRG4PSH71KD
		50	1.90	10	TBD						IRG7PH50K10D	IRG7PH50K10D-E	
		60	2.50	10	1.93								IRGPS60B120KD
		75	1.90	10	TBD								IRG7PSH54K10D

Single High Efficiency IGBTs (no Tsc)

Voltage	Speed	I_C @ 100°C	$V_{CE(ON)}$ (typ)	TO-262	D-PAK	D²PAK	TO-220	TO-220 FullPak	TO-247	TO-247 (Long Lead)	Super TO-247
300	8-30 kHz	40	1.49						IRGP4086		
600	DC-1 kHz	8	1.58				IRG4BC10S				
		10	1.40				IRG4BC20S				
		13	1.40					IRG4IBC30S			
		18	1.40			IRG4BC30S-S	IRG4BC30S		IRG4PC30S		
		31	1.32				IRG4BC40S		IRG4PC40S		
		41	1.28						IRG4PC50S		
	1-8 kHz	9	1.66		IRG4RC20F		IRG4BC20F				
		17	1.59				IRG4BC30F		IRG4PC30F		
		27	1.50				IRG4BC40F		IRG4PC40F		
		39	1.45						IRG4PC50F	IRG4PC50F-E	
		60	1.50						IRG4PC60F		
	8-30 kHz	5	2.15		IRG4RC10U						
		7	1.85				IRG4BC20U		IRG4PC20U		
		12	1.50					IRG6IC30U			
		12	1.70					IRG7IC28U			
		12	1.95				IRG4BC30U		IRG4PC30U		
		20	1.72				IRG4BC40U		IRG4PC40U		
		27	1.65						IRG4PC50U		
		30	1.70			IRG7SC28U					
		33	1.70						IRG7PC28UPBF		
		40	1.70						IRG4PC60U		
		60	1.67								IRG4PSC71U
	30-150 kHz	6	2.16					IRG4IBC20W			
		7	2.16			IRG4BC20W-S	IRG4BC20W				
		8	2.10					IRG4IBC30W			
		12	2.10			IRG4BC30W-S	IRG4BC30W		IRG4PC30W		
		20	2.05	IRG4BC40W-L		IRG4BC40W-S	IRG4BC40W		IRG4PC40W		
		27	1.93						IRG4PC50W		
900		28	2.25						IRG4PF50W		
1,200	DC-1 kHz	33	1.47						IRG4PH50S	IRG4PH50S-E	
	8-30 kHz	20	3.05							IRGP20B120U-E	
		21	2.43						IRG4PH40U		
		24	2.78						IRG4PH50U	IRG4PH50U-E	
		35	1.90						IRG7PH35U	IRG7PH35U-E	
		40	3.12								IRGPS40B120U
		50	2.52								IRG4PSH71U
		60	1.70						IRG7PH42U	IRG7PH42U-E	
		75	1.70						IRG7PH46U	IRG7PH46U-E	
		90	1.70						IRG7PH50U	IRG7PH50U-E	

Co-Pack High Efficiency IGBTs (no Tsc)

Voltage	Speed	I_C @ 100°C	$V_{CE(ON)}$ (typ)	V_F (typ)	TO-262	D-PAK	D²PAK	TO-220	TO-220 FullPak	TO-247	TO-247 (Long Lead)	Super TO-247
330	8-30 kHz	40	1.36	1.19				IRG6B330UD				
600	DC-1 kHz	8	1.58	1.50	IRG4BC10SD-L	IRG4RC10SD	IRG4BC10SD-S	IRG4BC10SD				
		10	1.40	1.40			IRG4BC20SD-S	IRG4BC20SD				
	1-8 kHz	9	1.66	1.40				IRG4BC20FD				
		17	1.59	1.40			IRG4BC30FD-S	IRG4BC30FD		IRG4PC30FD		
		17	1.59	1.40				IRG4BC30FD1				
		27	1.50	1.30						IRG4PC40FD		
		39	1.45	1.30						IRG4PC50FD	IRG4PC50FD-E	
	8-30 kHz	4	2.15	1.50					IRG4IBC10UD			
		5	2.15	1.50		IRG4RC10UD		IRG4BC10UD				
		6	1.85	1.40					IRG4IBC20UD			
		7	1.85	1.40			IRG4BC20UD-S	IRG4BC20UD				
		8	2.02	1.50	IRG4BC15UD-L		IRG4BC15UD-S	IRG4BC15UD				
		9	1.95	1.40					IRG4IBC30UD			
		12	1.95	1.40				IRG4BC30UD		IRG4PC30UD		
		20	1.72	1.30						IRG4PC40UD	IRG4PC40UD-E	
		27	1.65	1.30						IRG4PC50UD	IRG4PC50UD-E	
		60	1.67	1.40								IRG4PSC71UD
	30-150 kHz	22	2.50	1.50				IRGB20B60PD1				
		22	2.50	1.40						IRGP20B60PD	IRGP20B60PD-E	
		34	2.25	1.30						IRGP35B60PD	IRGP35B60PD-E	
		42	2.00	1.50						IRGP50B60PD	IRGP50B60PD-E	
		45	2.00	1.30						IRGP50B60PD1	IRGP50B60PD1-E	
900		28	2.25	2.50						IRG4PF50WD		
1,200	8-30 kHz	18	1.90	1.15						IRG7PH28UD1	IRG7PH28UD1M	
		21	2.43	2.60						IRG4PH40UD	IRG4PH40UD-E	
		21	2.43	3.40							IRG4PH40UD2-E	
		24	2.78	2.50						IRG4PH50UD	IRG4PH50UD-E	
		25	1.90	2.80						IRG7PH35UD		
		25	1.90	1.15						IRG7PH35UD1	IRG7PH35UD1-E / IRG7PH35UD1M	
		30	1.69	1.08						IRG7PH42UD2	IRG7PH42UD2-E	
		40	1.70	2.00						IRG7PH42UD	IRG7PH42UD-E	
		45	1.70	1.15						IRG7PH42UD1	IRG7PH42UD1-E / IRG7PH42UD1M	
		50	2.52	2.92								IRG4PSH71UD
		57	1.70	3.10						IRG7PH46UD	IRG7PH46UD-E	
		70	1.70	3.00								IRG7PSH50UD

Recently Released

International Rectifier

Product Line Overview

Product Line	Applications	Key Products
 **Energy Saving Products** Integrated design platforms that enable customers to add energy-conserving features that achieve lower operating energy costs and manufacturing Bill of Material (BOM) costs.	• Appliances • Audio • Display • Industrial • Lighting • SMPS	• Digital Control ICs • High-Voltage ICs • IGBTs • IRAM Integrated Power Modules • MERs • *µIPM*™
 **Enterprise Power** Optimized power management system solutions that deliver benchmark power density, efficiency and performance in enterprise power.	• Servers • Storage Networks • Switchers & Routers • Workstations • Notebooks • Game Stations • Set-Top Box	• DirectFET®*plus* • Sup*IR*Buck® • PowIRstage® • CHiL Digital Controllers
 **Automotive** Automotive grade power management solutions qualified to meet the needs of 12V, 24V and HEV/EV applications with a zero defect goal.	• AC and DC Motor Drives • Powertrain / Engine control • Body Electronics • Lighting • Class D Audio • Heavy Loads and Actuators	Automotive Qualified: • HEXFET® Power MOSFETs • Intelligent Power Switches • Driver ICs • IGBTs • DirectFET®**2** • COOLiR™
 **Benchmark MOSFETs** IR continues to lead the industry by offering power MOSFETs with the lowest $R_{DS(on)}$ and widest range of packages up to 250V for a diverse range of applications.	• Audio • Computing • Communications • Motor Control • Power Supply • Synchronous Rectification	• Discrete HEXFET® MOSFETs • Dual HEXFET® MOSFETs • FETKY® • DirectFET®
 **HiRel** Our discrete components, complex hybrid power module assemblies and rugged DC-DC converters utilize leading-edge power technology which, together with demanding environmental specifications help engineers to meet their toughest design challenges.	• Space • Military • Commercial Aviation • Rugged Industrial • Medical	• RAD-Hard MOSFETs • Power Modules/Hybrid Solutions • Motor Control Solutions • DC-DC Converters